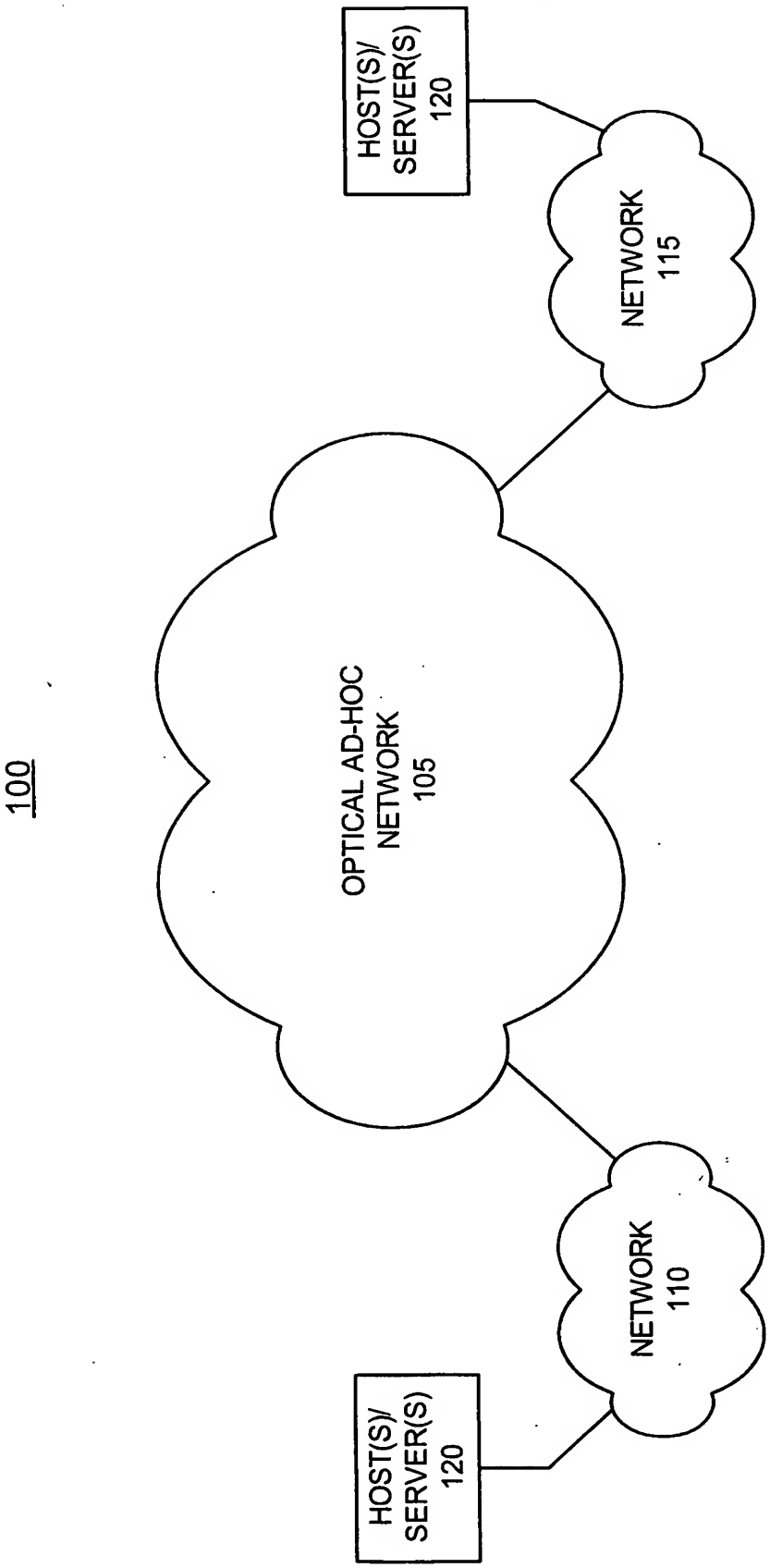

100
OPTICAL AD-HOC NETWORK 105
NETWORK 115
NETWORK 110
HOST(S)/ SERVER(S) 120
HOST(S)/ SERVER(S) 120

FIG. 1

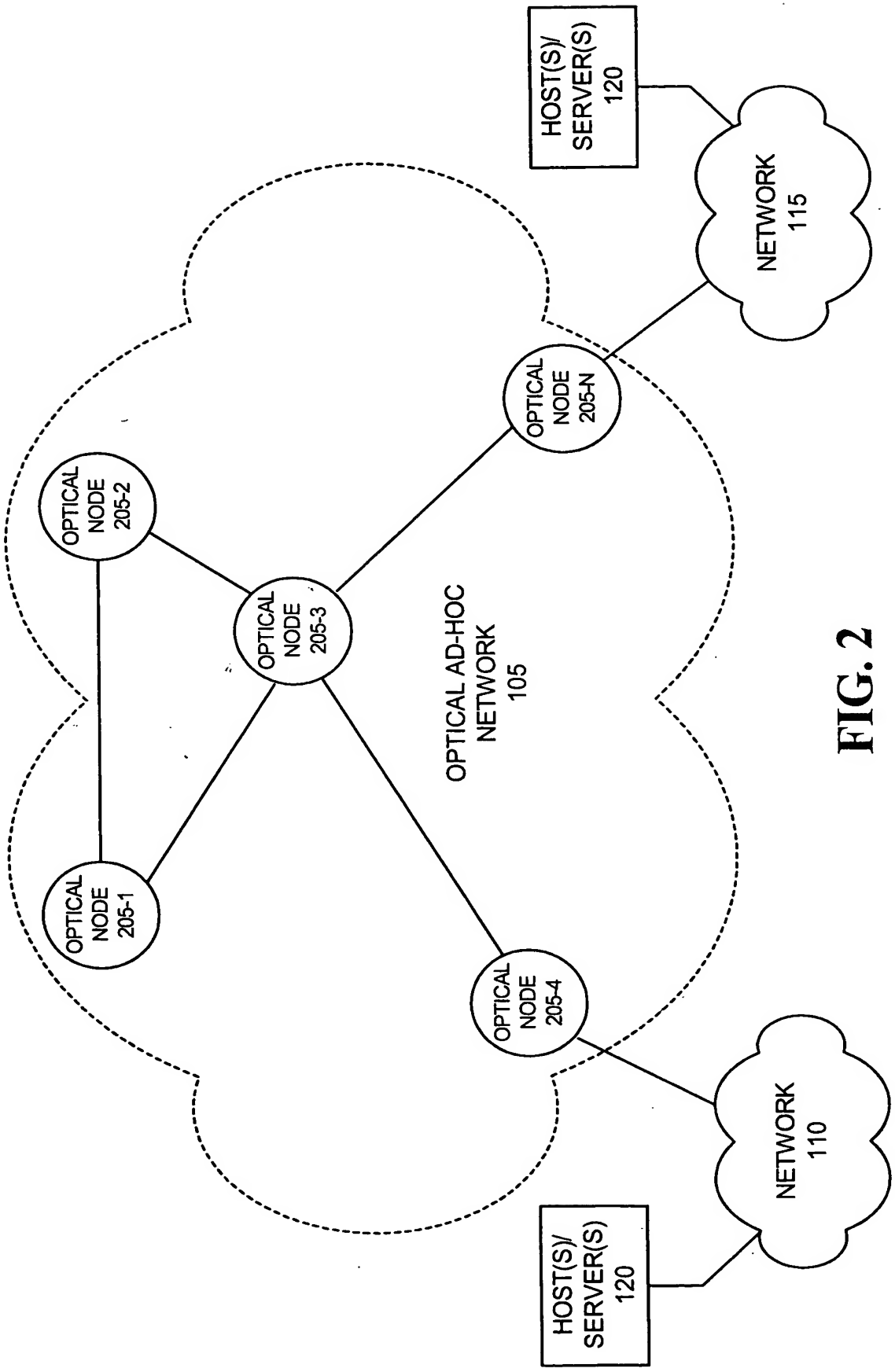

HOST(S)/
SERVER(S)
120
NETWORK
115
OPTICAL
NODE
205-N
OPTICAL
NODE
205-2
OPTICAL
NODE
205-3
OPTICAL AD-HOC
NETWORK
105
OPTICAL
NODE
205-1
OPTICAL
NODE
205-4
NETWORK
110
HOST(S)/
SERVER(S)
120

FIG. 2

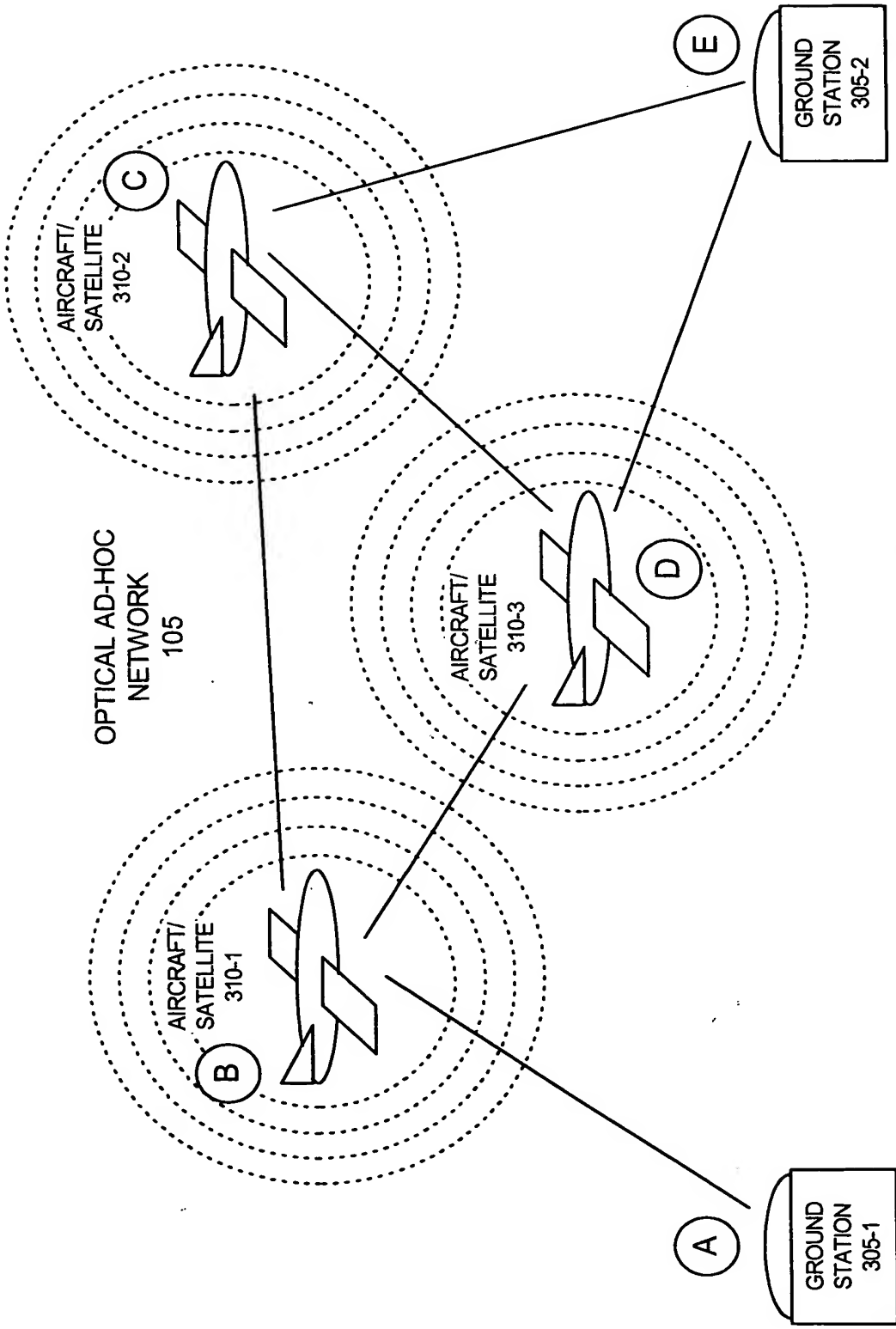

OPTICAL AD-HOC
NETWORK
105
AIRCRAFT/
SATELLITE
310-1
AIRCRAFT/
SATELLITE
310-2
AIRCRAFT/
SATELLITE
310-3
A
B
C
D
E
GROUND
STATION
305-1
GROUND
STATION
305-2

FIG. 3

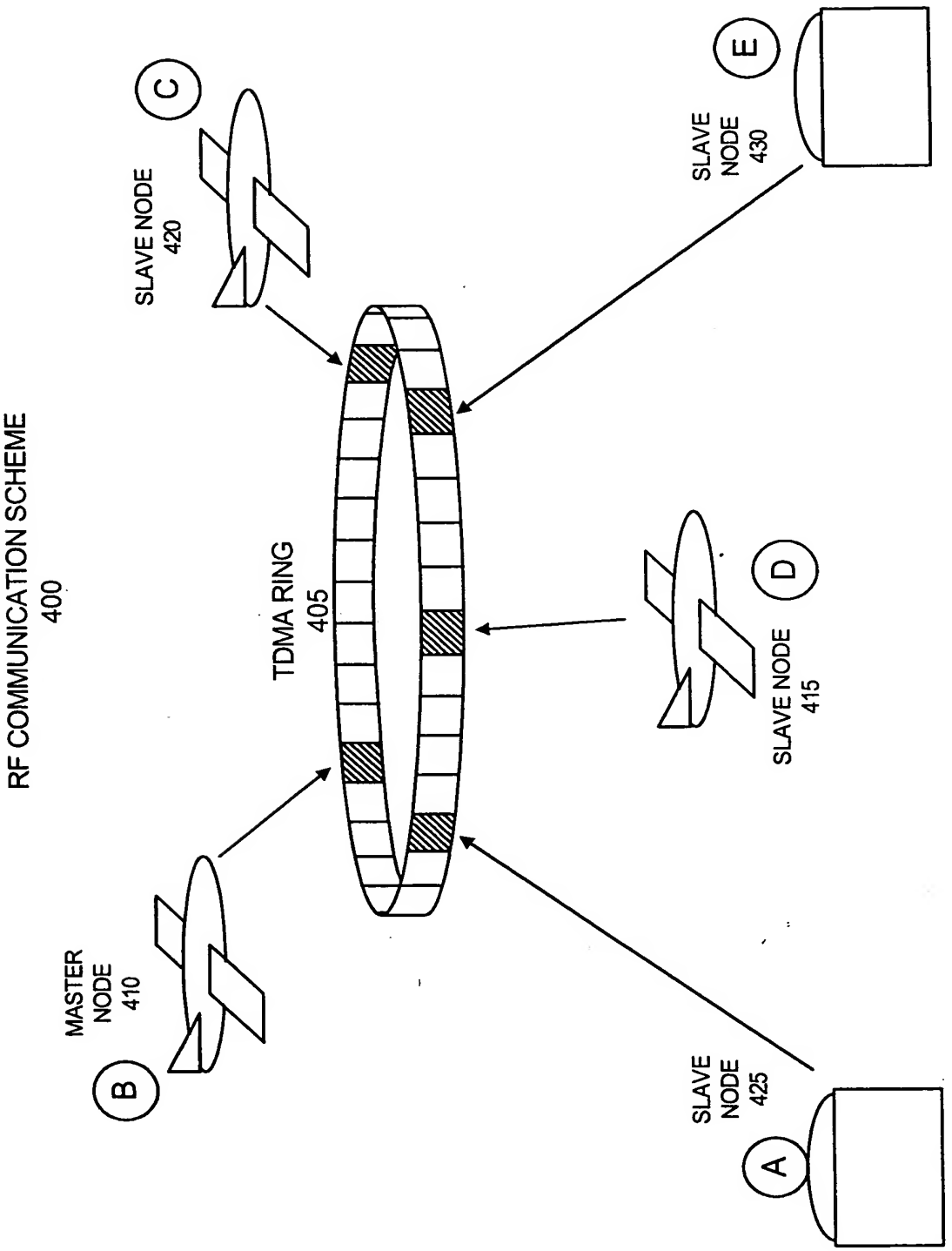

RF COMMUNICATION SCHEME
400
TDMA RING
405
MASTER
NODE
410
B
SLAVE NODE
420
C
SLAVE NODE
415
D
SLAVE
NODE
425
A
SLAVE
NODE
430
E

FIG. 4

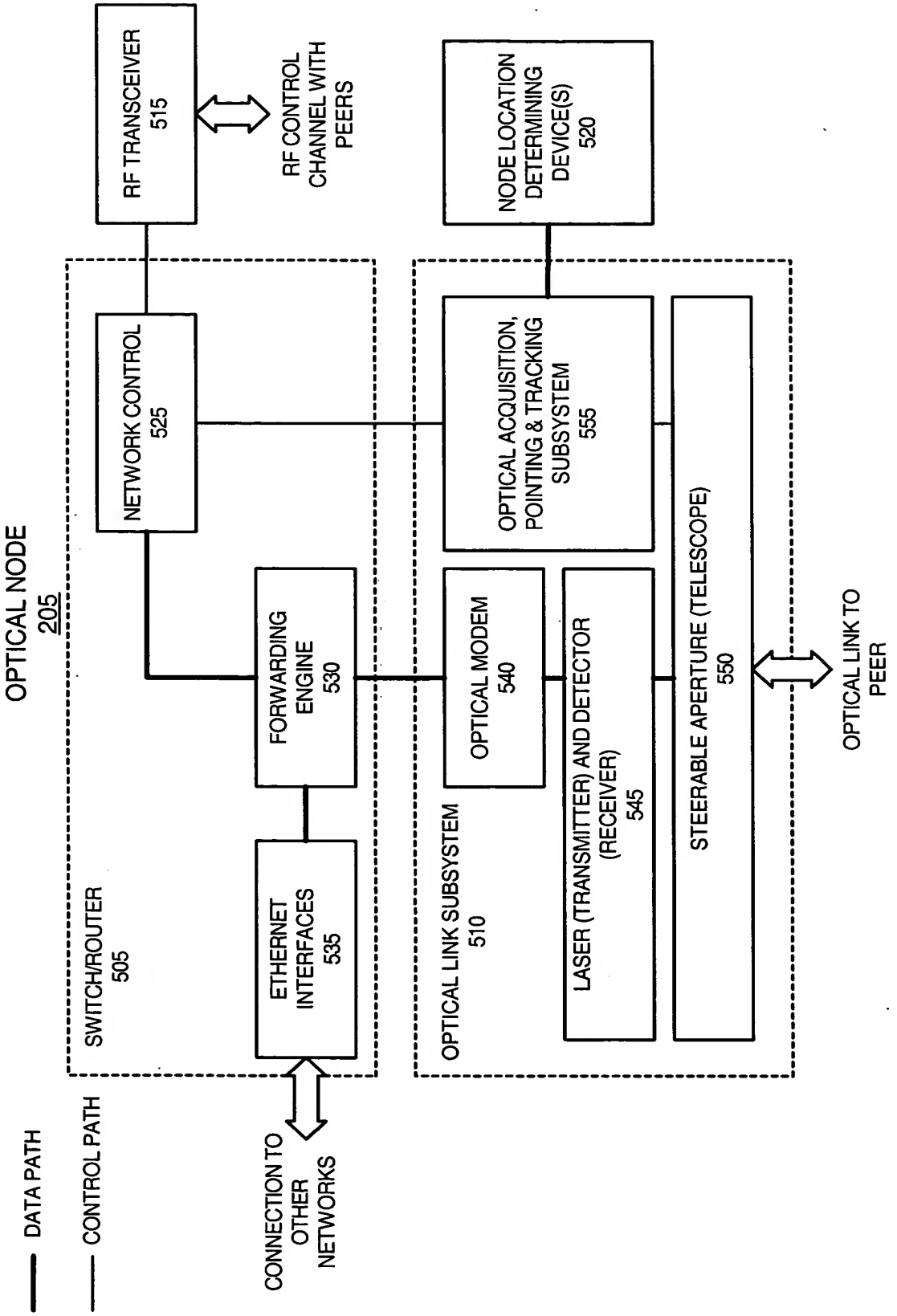

OPTICAL NODE
205
SWITCH/ROUTER
505
OPTICAL LINK SUBSYSTEM
510
RF TRANSCEIVER
515
RF CONTROL
CHANNEL WITH
PEERS
NODE LOCATION
DETERMINING
DEVICE(S)
520
NETWORK CONTROL
525
OPTICAL ACQUISITION,
POINTING & TRACKING
SUBSYSTEM
555
FORWARDING
ENGINE
530
OPTICAL MODEM
540
LASER (TRANSMITTER) AND DETECTOR
(RECEIVER)
545
STEERABLE APERTURE (TELESCOPE)
550
ETHERNET
INTERFACES
535
OPTICAL LINK TO
PEER
CONNECTION TO
OTHER
NETWORKS
DATA PATH
CONTROL PATH

FIG. 5

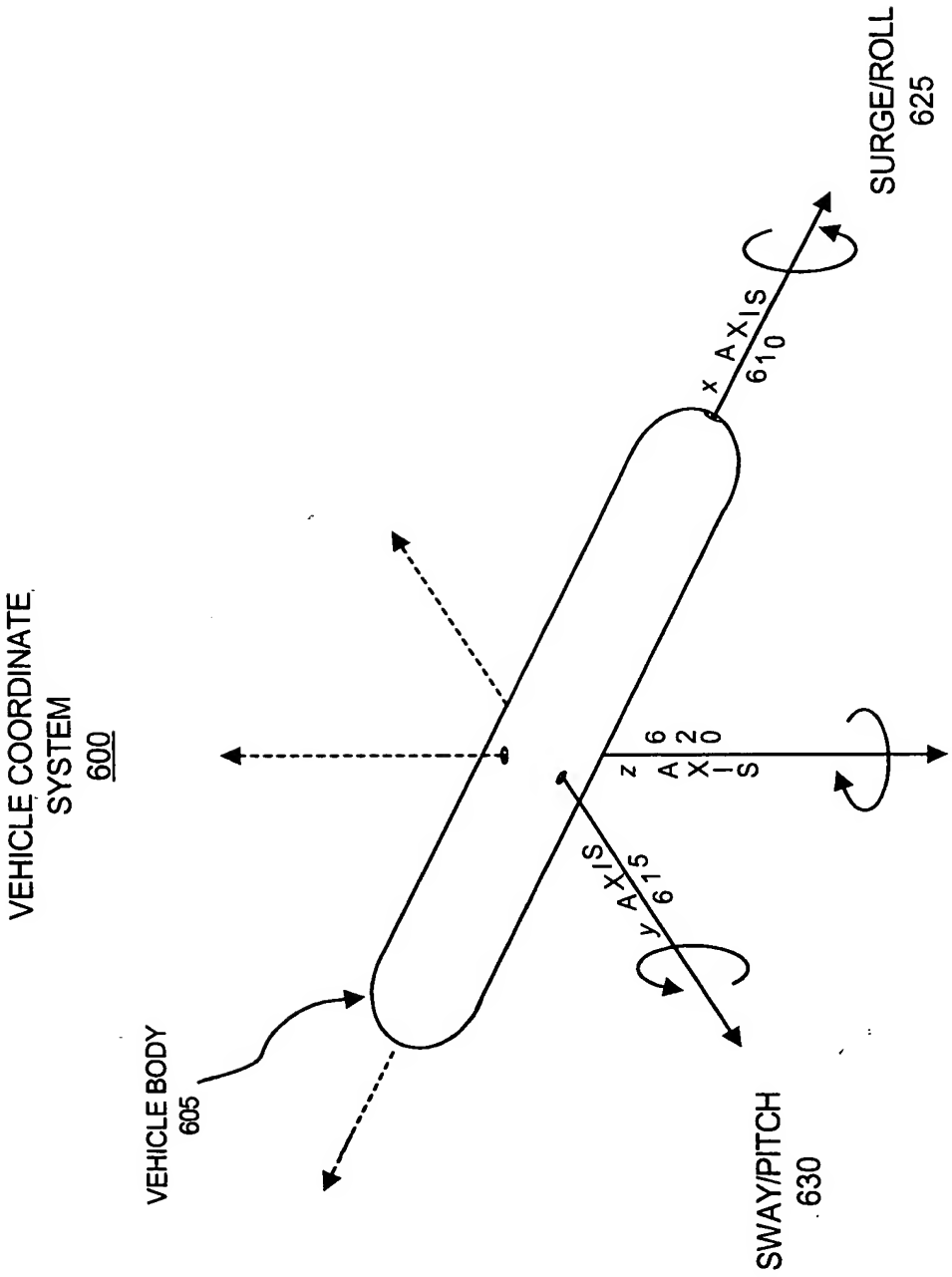

VEHICLE COORDINATE SYSTEM
600
VEHICLE BODY
605
x AXIS
610
y AXIS
615
z AXIS
620
SURGE/ROLL
625
SWAY/PITCH
630
HEAVE/YAW
635

FIG. 6

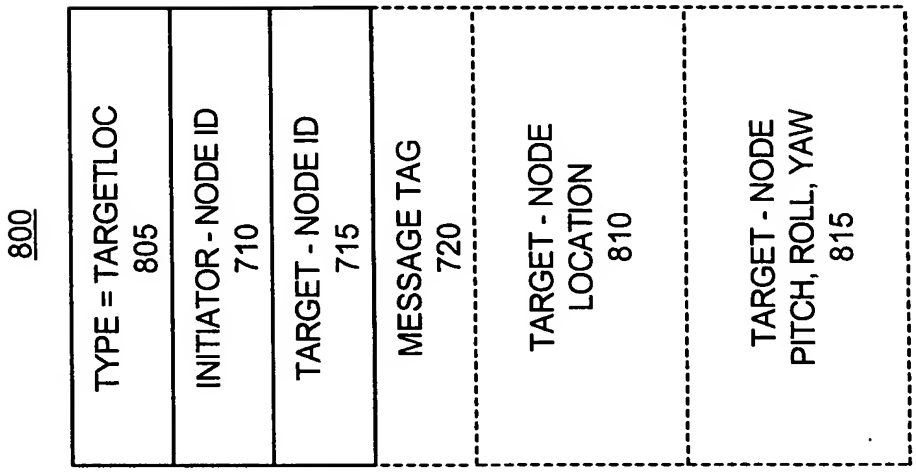

800
TYPE = TARGETLOC
805
INITIATOR - NODE ID
710
TARGET - NODE ID
715
MESSAGE TAG
720
TARGET - NODE
LOCATION
810
TARGET - NODE
PITCH, ROLL, YAW
815

FIG. 8

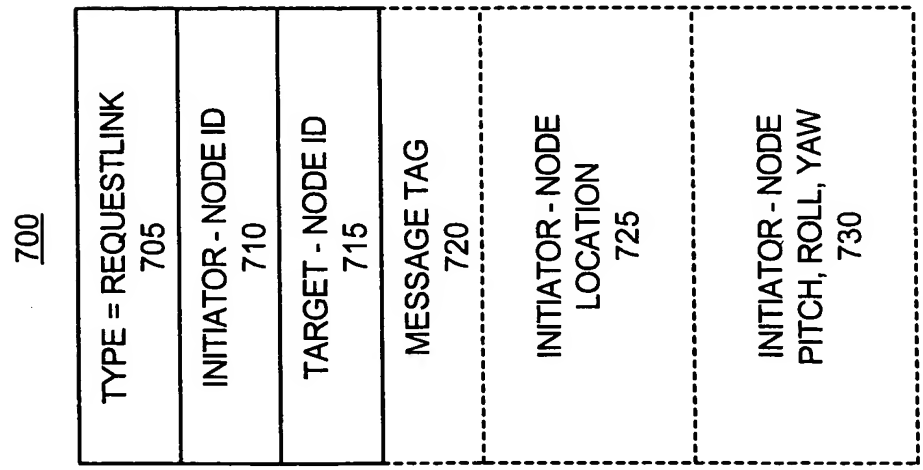

700
TYPE = REQUESTLINK
705
INITIATOR - NODE ID
710
TARGET - NODE ID
715
MESSAGE TAG
720
INITIATOR - NODE
LOCATION
725
INITIATOR - NODE
PITCH, ROLL, YAW
730

FIG. 7

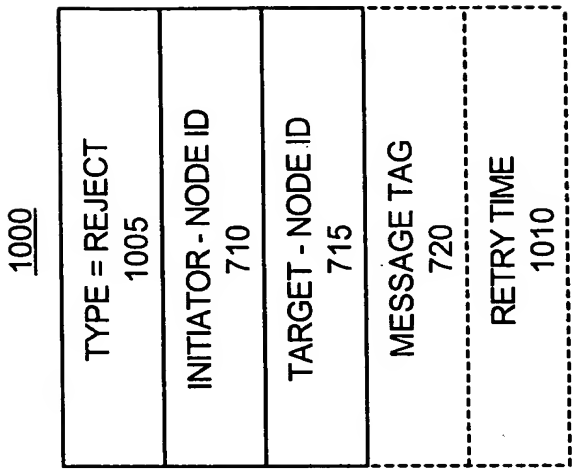

1000
TYPE = REJECT
1005
INITIATOR - NODE ID
710
TARGET - NODE ID
715
MESSAGE TAG
720
RETRY TIME
1010

FIG. 10

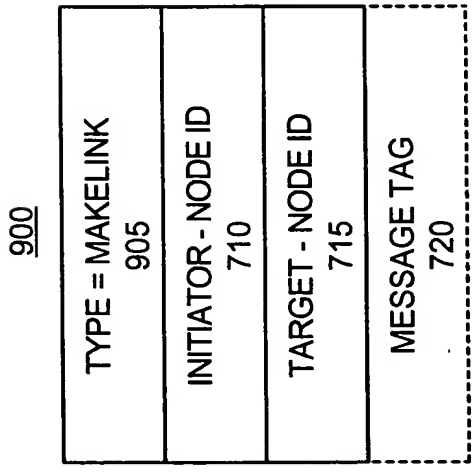

900
TYPE = MAKELINK
905
INITIATOR - NODE ID
710
TARGET - NODE ID
715
MESSAGE TAG
720

FIG. 9

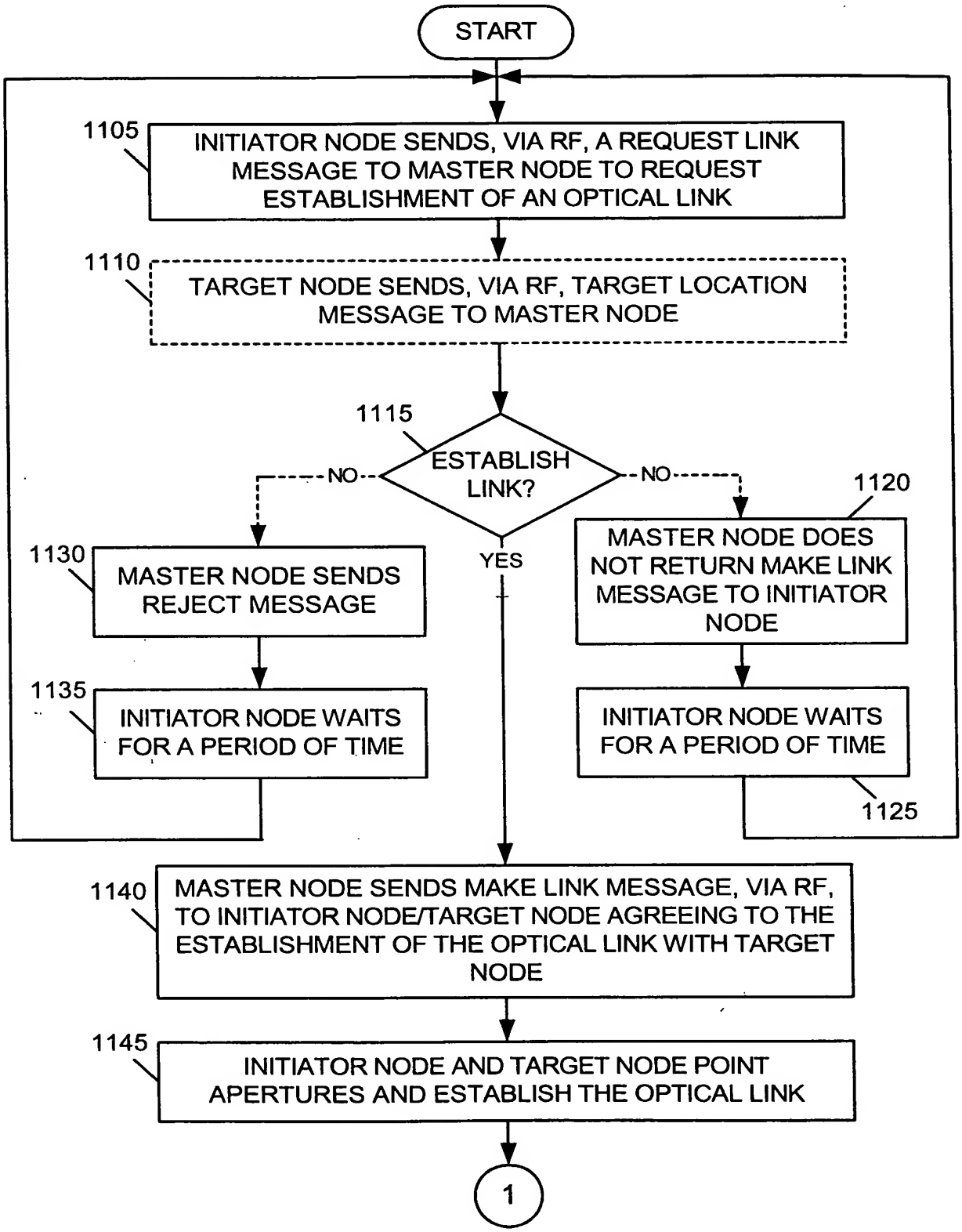

START
1105
INITIATOR NODE SENDS, VIA RF, A REQUEST LINK MESSAGE TO MASTER NODE TO REQUEST ESTABLISHMENT OF AN OPTICAL LINK
1110
TARGET NODE SENDS, VIA RF, TARGET LOCATION MESSAGE TO MASTER NODE
1115
ESTABLISH LINK?
NO
NO
YES
1120
MASTER NODE DOES NOT RETURN MAKE LINK MESSAGE TO INITIATOR NODE
1130
MASTER NODE SENDS REJECT MESSAGE
1135
INITIATOR NODE WAITS FOR A PERIOD OF TIME
INITIATOR NODE WAITS FOR A PERIOD OF TIME
1125
1140
MASTER NODE SENDS MAKE LINK MESSAGE, VIA RF, TO INITIATOR NODE/TARGET NODE AGREEING TO THE ESTABLISHMENT OF THE OPTICAL LINK WITH TARGET NODE
1145
INITIATOR NODE AND TARGET NODE POINT APERTURES AND ESTABLISH THE OPTICAL LINK
1

FIG. 11

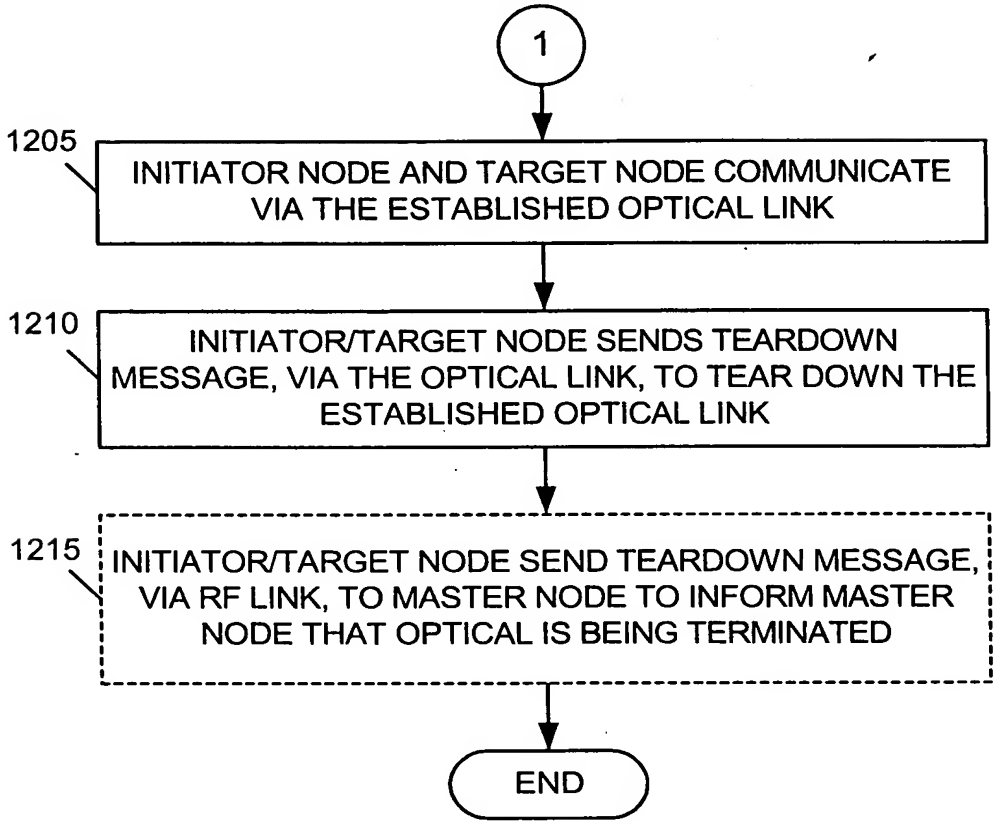
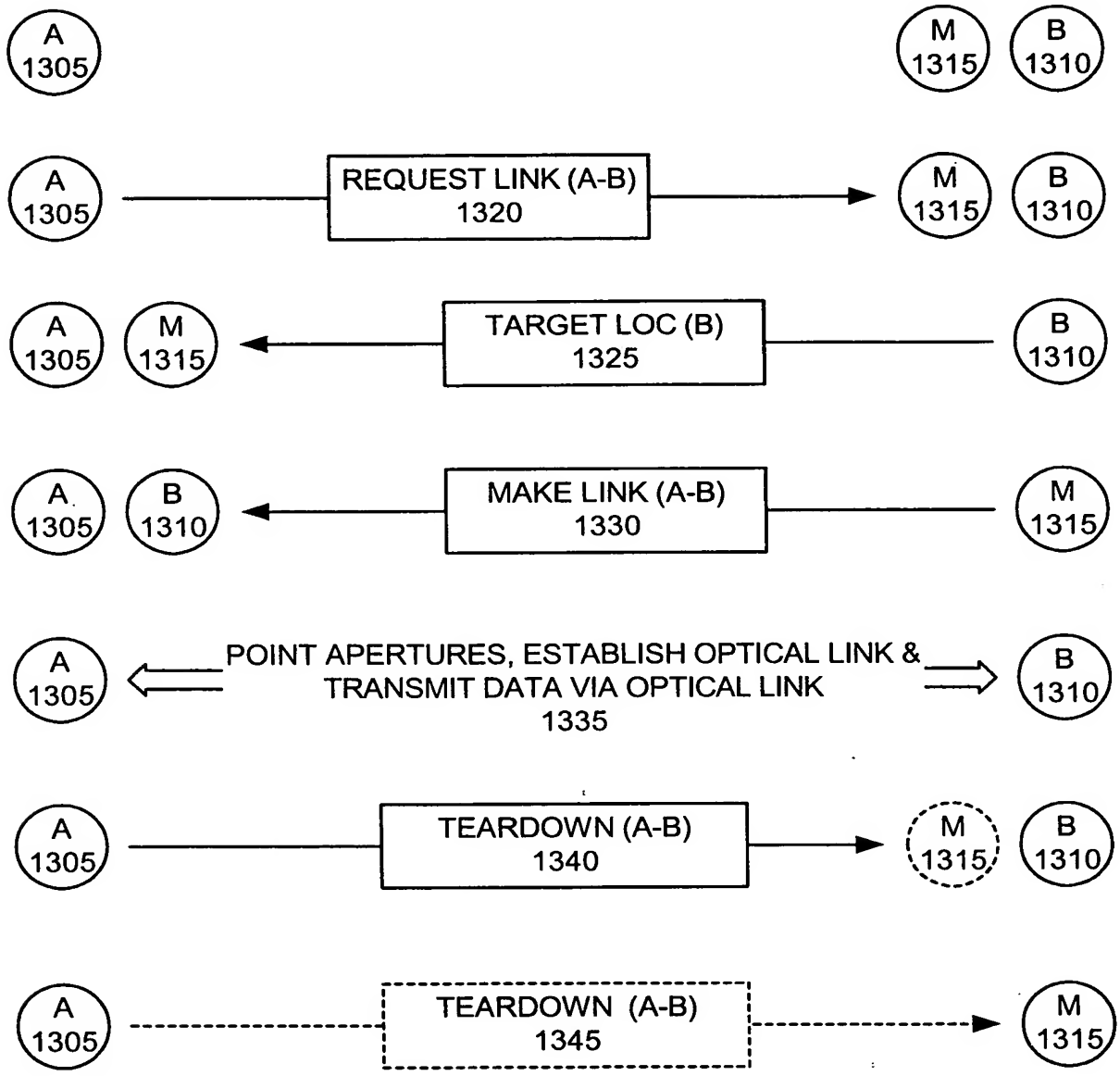

1
1205
INITIATOR NODE AND TARGET NODE COMMUNICATE VIA THE ESTABLISHED OPTICAL LINK
1210
INITIATOR/TARGET NODE SENDS TEARDOWN MESSAGE, VIA THE OPTICAL LINK, TO TEAR DOWN THE ESTABLISHED OPTICAL LINK
1215
INITIATOR/TARGET NODE SEND TEARDOWN MESSAGE, VIA RF LINK, TO MASTER NODE TO INFORM MASTER NODE THAT OPTICAL IS BEING TERMINATED
END

FIG. 12



A= INITIATOR NODE
B=TARGET NODE
M= MASTER NODE

FIG. 13

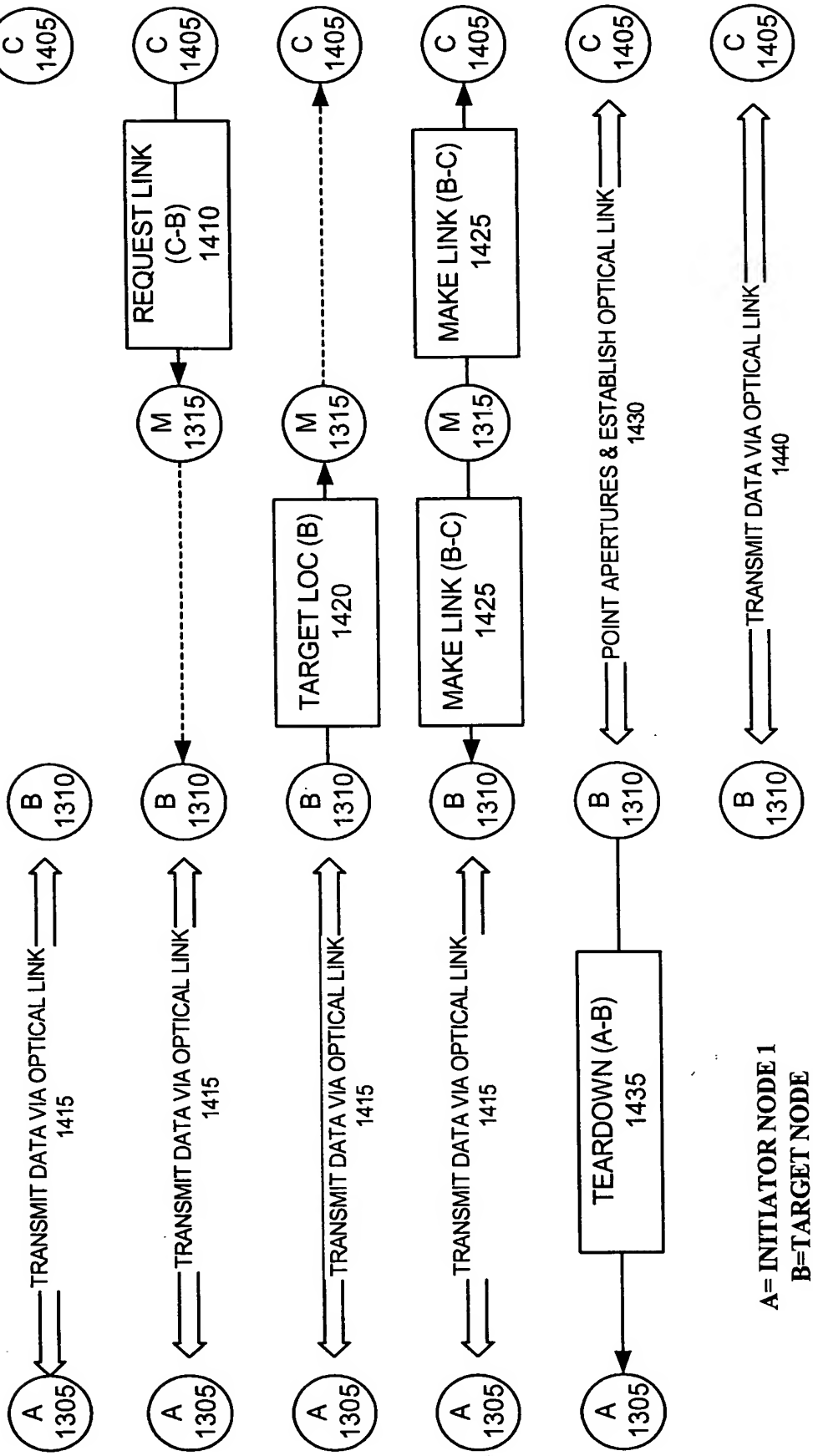

A 1305
B 1310
C 1405
M 1315
TRANSMIT DATA VIA OPTICAL LINK 1415
REQUEST LINK (C-B) 1410
TARGET LOC (B) 1420
MAKE LINK (B-C) 1425
POINT APERTURES & ESTABLISH OPTICAL LINK 1430
TEARDOWN (A-B) 1435
TRANSMIT DATA VIA OPTICAL LINK 1440
A= INITIATOR NODE 1
B=TARGET NODE
C=INITIATOR NODE 2
M= MASTER NODE

FIG. 14